Grease Removal Device Sizing Methods:

The sizing methods described are intended as pre-liminary guidance in determining grease trap and/or grease interceptor sizes that will afford the North Charleston Sewer District a minimum degree of protection against grease and other obstructing materials. Any sink, etc. discharging into the sanitary sewer that is used for cleaning and/or food prep must be connected to a grease interceptor. Dishwashers and garbage/food grinders shall not be tied to the grease interceptor. NCSD must pre-approve the installation of any Grease Removal Device.

Method 1: Sizing Using Fixture Capacity

This method is normally used in establishments with limited seating or in establishments where an exterior grease removal device is not feasible. Usually, this method provides calculated volumes that are small enough to allow for the use of Under-the-Counter type trap; however, this is not always the case.

Step 1: Determine the volume for each fixture in cubic inches by performing the following calculations:

\[ \text{Length x Width x Depth x Number of compartments} = \text{cu. In.} \]

Example: Small sandwich shop
Fixtures:
- Fixture 1 (triple compartment sink) = 18” x 18” x 10” x 3 = 9,720 cubic inches (cu. In.)
- Fixture 2 (pre-rinse sink) = 14” x 14” x 10” x 1 = 1,960 cu. In.

Step 2: Determine volume in gallons for each fixture by performing the following calculations:

\[ \frac{\text{cu. In.}}{231} = \text{gallons (gal)} \]

<table>
<thead>
<tr>
<th>Fixture</th>
<th>Volume (cu. In.)</th>
<th>Volume (gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixture 1</td>
<td>9,720</td>
<td>42.1 gal</td>
</tr>
<tr>
<td>Fixture 2</td>
<td>1,960</td>
<td>8.5 gal</td>
</tr>
</tbody>
</table>

Step 3: Determine actual drainage load for each fixture. The fixture is normally filled to about 75% of capacity with water. The items being washed displace about 25% of the fixture content, thus actual drainage load = 75% of fixture capacity.

\[ \text{Fixture Volume} \times 0.75 = \text{gallons} \]

<table>
<thead>
<tr>
<th>Fixture</th>
<th>Volume (gal)</th>
<th>Actual Drainage Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixture 1</td>
<td>42.1 gal</td>
<td>31.58 gal</td>
</tr>
<tr>
<td>Fixture 2</td>
<td>8.5 gal</td>
<td>6.38 gal</td>
</tr>
</tbody>
</table>

Step 4: Determine the flow rate (in gallons per minute) for each fixture by performing the following calculations:

\[ \frac{\text{Volume in gallons}}{1 \text{ min}\ast} = \text{gallons per minute (gpm)} \]

<table>
<thead>
<tr>
<th>Fixture</th>
<th>Flow Rate (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixture 1</td>
<td>31.58</td>
</tr>
<tr>
<td>Fixture 2</td>
<td>6.38</td>
</tr>
</tbody>
</table>

\ast Drainage period is the actual time required to completely drain the fixture. In general, good practice dictates a 1 minute drainage period.

Step 5: Determine the total flow rate for all fixtures by adding together the flows for all of the fixtures.

\[ (\text{Flow from fixture 1}) + (\text{Flow from fixture 2}) = \text{Total flow capacity (gpm)} \]

31.58 + 6.38 = 37.96 gpm = 38 gpm
Step 6: Calculate the required trap size by performing the following calculations:

\[
\text{Total flow capacity} \times \text{Required retention time}^* = \text{Minimum grease trap size (gal)}
\]

38 gpm \times 4 \text{ min} = 152 \text{ gallon trap size}

*Required retention time should be determined using Table 1 below.

<table>
<thead>
<tr>
<th>Type of Food Service Establishment</th>
<th>Retention Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee or Beverage Shop, No Food</td>
<td>2</td>
</tr>
<tr>
<td>Small Establishments without Fryers</td>
<td>4</td>
</tr>
<tr>
<td>Pizza Parlors and Food Establishments Using Baking Sheets/Pans</td>
<td>6</td>
</tr>
<tr>
<td>Food Service Establishments that have some fried items on the menu</td>
<td>8</td>
</tr>
<tr>
<td>Food Service Establishments that primarily serve fried food</td>
<td>10</td>
</tr>
</tbody>
</table>

Method 2: Sizing Using Uniform Plumbing Code Drainage Fixture Units (DFUs)

Using this method, exterior grease interceptors shall typically be sized by the required grease capacity to support a pump-out frequency of 90 days.

Step 1: Use Table 702.1 of Universal Plumbing Code (UPC) to determine the DFU value for each fixture.

Example:
Sarah’s Soul Food
- 1 commercial dishwasher, 25 gpm, 2” trap
- Prep sink, 2” trap
- Triple sink, each compartment 18” x 18” x 8” with 1.5” trap
- 2 floor drains, each with 2” trap

Kitchen DFU Values:
Prep sink at 3 DFUs each = 3 DFUs
Triple sink at 3 DFUs each = 3 DFUs
2 floor drains at 2 DFUs each = 4 DFUs

Step 2: Calculate the total DFUs for all of the fixtures by adding them all together.

3 + 3 + 4 = 10 total DFUs

Step 3: Use Table 1014.3.6 of the UPC to determine the appropriate grease interceptor size (the DFU value in the first column of the table should be consider the maximum allowable DFUs for that size grease interceptor).

10 total DFUs means this restaurant needs a 750 gallon grease interceptor.
Resources
